Searching for Sustainability

Interdisciplinary Essays in the Philosophy of Conservation Biology

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Contents

1

The Constancy of Leopold's Land Ethic

In 1920 Aldo Leopold enthusiastically described his predator eradication program. He had formed a coalition of sportsmen and stockmen to eliminate wolves, mountain lions, and other large predators from Arizona and New Mexico: "But the last one must be caught before the job can be called fully successful," he said (Flader 1974: 3). Twenty-four years later Leopold repented his war on wolves in a graceful and humble essay, "Thinking Like a Mountain," which was drafted in 1944 and published in *A Sand County Almanac and Sketches Here and There*. What happened in the meantime?

It is tempting to believe that, during this period, Leopold discovered his revolutionary land ethic, that his thinking underwent a profound religious-metaphysical-moral change, and that his about-face on predator control programs was a direct result of this profound philosophical conversion. Since Leopold was acting, in 1920, as a representative of the U.S. Forest Service, which remained under the philosophical domination of Gifford Pinchot's humanistic utilitarianism, this interpretation sees Leopold as later rejecting utilitarian management because he came to espouse "a right to exist" for all members of the land community (*see*, for example, Petulla 1980: 16, 20).

This essay seeks to show that Leopold's intellectual odyssey during this period was more complex than this straightforward account would suggest. In particular, Leopold had embraced the main philosophical elements of his land ethic early in his career, even while he was advocating predator eradication. These main elements include important influences, hitherto unnoticed, derived from American pragmatism, a philosophical approach that Leopold borrowed from Arthur Twining Hadley, who was president of Yale University when Leopold was a student there. Leopold never abandoned the

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main elements of his early philosophy, and I will argue that his shift from predator eradication to predator protection was motivated, not by a shift in religious, metaphysical, or moral views, but rather by a recognition that scientific knowledge is inadequate to guide gross manipulations of ecosystems and by an increasingly pessimistic view of the prospects of environmental management. I conclude that, while Leopold was fascinated by organicism and its metaphysical and moral implications, these abstract views had little direct impact on his managerial style.

I

In 1923 Leopold drafted an essay, "Some Fundamentals of Conservation in the Southwest" (Leopold 1979). He included, as a final section, some brief remarks that he called "Conservation as a Moral Issue." This essay remained unpublished until 30 years after Leopold's death; commentators have treated the final section as an immature draft of Leopold's conservation ethic, and some have suggested that Leopold later abandoned significant elements of the philosophy expressed there (Flader 1979: 143–144, Callicott 1987, Rolston 1987, note 3).

It cannot be denied that Leopold's brief 1923 discussion of conservation morality is confusing. In only three pages Leopold stated that "economic determinism" is insufficient to understand land conservation; invoked the prophet Ezekiel; considered the Russian organicist philosopher P. D. Ouspensky's view that the world is a "living thing" with "a soul, or consciousness"; questioned whether the world "was made for man's use, or has man merely the privilege of temporarily possessing an earth made for inscrutable purposes"; approvingly quoted John Muir on the rights of rattlesnakes but decided "I will not dispute the point"; and finally concluded that we have an obligation to future generations to prove ourselves "capable of inhabiting the earth without defiling it." Along the way, he admitted that most scientists and laymen hold "anthropomorphic" views.[1] He also considered the effect that Ouspensky's organicism would have on "most men of affairs," and observed that for them "this reason is too intangible to either accept or reject as a guide to human conduct" (Leopold 1979: 138–141).

It is difficult to see, at first glance, a unifying principle in this densely packed presentation of so many grand ideas. It seems clear that, after introducing nonanthropocentric ideas, Leopold opted in the end for a conservation ethic based on our obligations to future generations of humans – a forward-looking anthropocentrism. But the reasoning by which he shifted from

his prior discussion of organicism and nonanthropocentrism to longsighted anthropocentrism is so compact as to nearly defy understanding. Fortunately, a clue to Leopold's thinking appears in a parenthetical comment, which is embedded in his discussion of our obligations to future generations: "How happy a definition is that one of Hadley's which states, "Truth is that which prevails in the long run."

Since the essay was never published. Leopold prepared no notes or list of references. This definition, however, clearly derives from the American pragmatists (see, for example, Peirce 1978: 288). Arthur Twining Hadley, a child prodigy in Greek, graduated at the head of his class at Yale in 1876. He studied political economy at the University of Berlin and returned to become a tutor and later a professor at his undergraduate institution. Noted for the breadth of his knowledge, his classes on economics and political ethics were extremely popular. Hadley became the first lay president of Yale in 1899 (M. Hadley 1948). He described himself as a "thoroughgoing pragmatist" (M. Hadley 1948: 197) and generally quoted William James's work as representative of modern philosophical thinking.

In his most thoroughly philosophical book, *Some Influences in Modern Philosophic Thought*, Hadley said: "The criterion which shows whether a thing is right or wrong is its permanence. Survival is not merely the characteristic of right; it is the test of right."[2] These views he characterized as the views of pragmatists and in the next paragraph he discussed James's view, which he stated as "We hold the beliefs which have preserved our fathers" and accepted this view while changing its emphasis somewhat:

> I do not mean that we should consciously adopt a belief because it is useful to us, as James seems to imply. I would rather take the ground that we hold the belief that has preserved our fathers as an intuition and act on it as an instinct. (A. T. Hadley 1913: 73)

Leopold began "Conservation as a Moral Issue" with a quotation from Ezekiel:

> Seemeth it a small thing unto you to have fed upon good pasture, but you must tread down the residue of your pasture? And to have drunk of the clear water, but ye must foul the residue with your feet? (Leopold, 1979; 138)

When Leopold invoked Ezekiel, he was invoking the "beliefs that have preserved our fathers." As understood by Hadley, the pragmatists' notion of truth amounted to a recommendation that we respect the wisdom of our ancestors. Hadley said:

> The moral and religious instincts that bind the group together, which some men, not so many years ago, were condemning as outworn prejudices, count for even more than individual intelligence. In our practical philosophy, of politics and of life, we are reverting to the words of Edmund Burke: "We are afraid to put men to live and trade each on his own private stock of reason, because we suspect that this stock in each man is small, and that the individuals would do better to avail themselves of the general bank and capital of nations and of ages." (Hadley 1913: 75)

These ideas, due to Hadley and the pragmatists, provide the key to understanding an important passage in Leopold's "Conservation as a Moral Issue." Leopold said, "Possibly, in our intuitive perceptions, which may be truer than our science and less impeded by our words than our philosophies, we realize the indivisibility of the earth." This brief passage shows a connection between three important and related ideas in Leopold's thought. He was referring to Hadley's conception of "truth" or "rightness" of social practices interpreted as the "intuitive perceptions" we have inherited from Ezekiel and others who have counseled protection of resources. Second, he implied that our science is fallible, and perhaps less reliable than these intuitive perceptions. Finally, he suggested that our intuitions are more helpful than philosophies, because the latter are "impeded by language."

In a discussion of Darwin's influence on history and political science, Hadley explained that Darwin's idea of survival of the fittest was readily accepted by historians, who had long recognized that survival of a culture depended on the adaptability of its institutions to situation (Hadley 1913: 121–126). He criticized Herbert Spencer and others for trying to apply the Darwinian criterion over too brief time periods and to individual behaviors (Hadley 1913: 130). Hadley concluded: "It is the institution even more than the man that has been marked out for survival by the process of natural selection" (Hadley 1913: 127).

I have found no evidence that Leopold read or studied the American pragmatists in detail, although he no doubt knew about the publication of Hadley's book, as it was given a major review in the *Yale Review* (Sherman 1913). Apparently, Leopold read this magazine regularly.[3] Further, Leopold was clearly familiar with, and impressed by, Hadley's conception of truth, because he referred to it on several occasions in the journals he kept during this early period of his career.[4] It may, at this point, be impossible to determine the extent of Leopold's study of Hadley, but it is clear that Leopold absorbed and applied the basic elements of Hadley's approach to evaluating cultures.

When Leopold mentioned intuitive perceptions, Ezekiel's admonition to treat the land with respect, he was invoking Hadley's intuitions of our fathers.

In this same passage Leopold compared this intuition favorably with both science and philosophy. Since Leopold was here striving for a very large-scale understanding, a kind of worldview, to support his conservation goals, it is important to examine the treatment he gave both philosophy and science in this large perspective.

Leopold is obviously wary of philosophical pronouncements. In only three pages "Conservation as a Moral Issue" contains no less than five cautions against the "pitfalls of language," and three of them are related to doubts about the efficacy of philosophical ideas. While on first reading these passages may appear as expressions of humility and little more, I believe they also provide a clue to the philosophical approach underlying Leopold's conservation ethic. These references to language derive from the linguistic pluralism of Ouspensky's *Tertium Organum*, which Leopold here blended with American pragmatism as a justification for a longsighted anthropocentrism to support his conservation ethic.

In his discussion of Ouspensky, Leopold characterized two "conceptions of the earth." There is a "mechanistic conception of the earth as our physical provider and abiding place." This conception was opposed to another: the world is a living organism and the "soil, mountains, rivers, atmosphere, etc. – [are] organs, or parts of organs, of a coordinated whole, each part with a definite function." On this view of the world, which "many of the world's most penetrating minds" (he cited Ouspensky) have found compelling, the earth has "a soul or consciousness." It begins even to make sense to respect it as a living thing and to relate to it morally. In this context of competing worldviews, Leopold's references to the importance of language appear more significant:

> There is not much discrepancy, except in language, between this conception of a living earth, and the conception of a dead earth, with enormously slow, intricate, and interrelated functions among its parts, as given by physics, chemistry, and geology." (Leopold 1979; 139–140)

A similar form of conceptual pluralism, also linked with cautions about the inadequacy of language, is a major theme of Ouspensky's *Tertium Organum* (Ouspensky 1968: 222f).

I am suggesting that, in "Conservation as a Moral Issue," Leopold amalgamated ideas from the American pragmatists with the organicism of Ouspensky, concluding that the most effective conservation ethic represents a concern that we pass on, to future generations, a world not despoiled by our current activities. The relationships between these ideas become more explicit if one distinguishes several levels of discourse. When Leopold compared

different conceptions of the earth, he was speaking of what might be called second-order beliefs. The facts about the world around us, the facts of physics, chemistry, and geology, are first-order beliefs about the way the world is. Organicism and mechanism, two alternative conceptions of the world in Leopold's terminology, are second-order beliefs about how to interpret the first-order facts of the particular sciences. Leopold was arguing that organicism and mechanism can accept the same first-order facts about the world and that the choice between these two interpretations is mainly a difference of language. "The essential thing for present purposes is that both admit the interdependent functions of the elements" (Leopold 1979: 139–140). Thus, the choice of a second-order interpretation of scientific facts, the choice between organicism and mechanism as alternative conceptions of the world, is essentially a linguistic choice of how to conceptualize this interrelatedness.

Leopold placed so much emphasis on the pitfalls of language because he believed that empirical data from the natural sciences will never determine our second-order, linguistic choices as to how to conceptualize that data. These questions depend on human perception, not reality: "The very words *living thing* have an inherited and arbitrary meaning derived not from reality, but from human perceptions of human affairs" (Leopold 1979: 139). Further, he recognized that the choice of a conception of the world, an interpretation of the data, will be closely related to the way we think and act. Here we see the amalgamation of Ouspensky's organicism with Hadley's pragmatism. It is a central idea of American pragmatism that linguistic forms depend upon perception and perception depends in turn upon human affairs. What we do determines what we say and think as much as vice versa. Leopold combined pragmatism with Ouspensky's organicism and arrived at a form of homegrown perspectivism, a view that metaphysical conceptions of the world are projections of human perceptions which depend, in turn, upon cultural practices.

From this amalgamation, Leopold concluded that different cultures with radically different practices will have different characteristic vocabularies and therefore different conceptions of the world. But since these different conceptions of the world amount only to different conceptualizations of the same hard, scientific data, Leopold was cautious whenever he compared ideas from one conception with those from another. Leopold thus shied away from metaphysical and theological pronouncements: "It is just barely possible that God himself likes to hear birds sing and see flowers grow. But here again we encounter the insufficiency of words as symbols for reality." Similarly, his concern that philosophical and theological ideas are artifacts of conceptions of the world led Leopold to express a

deep distrust of pronouncements about the "truth" of anthropocentrism or nonanthropocentrism:

> Probably many of us who have neither the time nor the ability to reason out conclusions on such matters by logical processes have felt intuitively that there existed between man and the earth a closer and deeper relation than would follow the mechanistic conception of the earth. . . . Of course, in discussing such matters we are beset on all sides with the pitfalls of language. (Leopold 1979: 139)

So far, we have seen that Leopold understood Ouspensky's organicism and modern, atomistic science as two alternative conceptions of the world, the choice between which is a second-order choice among vocabularies for presenting first-order data, and unlikely to be fully decided by that data. At the same time, he recognized that the choice between these conceptions has profound consequences for the way we treat the earth. On a mechanistic worldview, the earth is dead and we would have no moral concern for it. This viewpoint has led to "economic determinism," which Leopold disparagingly characterized as the "language of compound interest." On the organicist view, the earth is alive and worthy of our respect and moral concern. But the choice between the two conceptions of the world is mainly a linguistic choice, underdetermined by the scientific data available.

This combination of views, without supplementation, would result in a radical relativism: we either speak as mechanistic scientists or as organicists and, depending on this arbitrary choice, we will either be economic determinists or we will react morally to the land. It is at this crucial juncture that Leopold introduced Hadley's definition of truth as that which prevails in the long run. Following Hadley, Leopold chose not to dispute the metaphysical and theological issues of anthropocentrism, but rather to rely on the intuitive perceptions of the tradition – Ezekiel. Or, to put the point in more Hadleian terms, the test of rightness of cultural practices is their long-term survivability. Hadley's pragmatic definition of truth therefore functioned, in Leopold's early philosophy, as a third-order principle, as a means to judge second-order conceptions of the world and to provide a criterion for distinguishing acceptable cultural practices from unacceptable ones.

This was surely an attractive idea to Leopold for several reasons. First, it provided a unification of his philosophical thought with his biological belief in the Darwinian principle of "survival of the fittest." Second, it allowed him to relate, in a larger perspective, scientific knowledge with his speculations about Ouspensky's organicism – these are two differing linguistic approaches to the same "earth." Third, it provided him an ideal platform from which to

denounce the practices, described in detail in the first two sections of "Some Fundamentals of Conservation in the Southwest," which he believed were destroying the land. Our treatment of the land is wrong because it is not sustainable, as Ezekiel said.

Immediately after he decided not to dispute anthropocentrism, Leopold granted "that the earth is for man." He then said, "there is still a question: what man? The cliff dwellers, the Pueblos, the Spaniards, and now the Americans all believed the earth was their possession." But the prior cultures "left the earth alive, undamaged." If we are "logically anthropomorphic," he said, we must consider what the next civilization will say of us. If there is, indeed, "a special nobility inherent in the human race – a special cosmic value, distinctive from and superior to all other life," then it must manifest itself in "a society decently respectful of its own and all other life, capable of inhabiting the earth without defiling it. "If we do not manifest that nobility, we shall "be judged in the derisive silence of eternity" (Leopold 1979: 141). Leopold was, ultimately, basing his argument for conservation on the fact that the land in the Southwest was going through a series of less and less productive cycles owing mainly to overgrazing. This factual basis, outlined in detail in earlier sections of the draft article, seemed to him an adequate basis for conservation when combined with Hadley's pragmatic definition of truth as survivability. This argument could be made independent of appeals to nonanthropocentrism, which is a second-order belief not possible to establish conclusively. By applying Hadley's definition of truth to the cultural practices that were causing deterioration of the land in the Southwest, Leopold could sidestep the issue of anthropocentrism and declare those practices "false." He relied not upon Ouspensky (in spite of his obviously deep attraction to organicism) but upon Ezekiel buttressed by Hadley's definition of truth.

Leopold's philosophical pragmatism also provides an explanation of his comment that "most men of affairs" will find organicism and other forms of nonanthropocentrism "too intangible to either accept or reject as a guide to human conduct" (Leopold 1979: 138–141). Leopold recognized that both modern science and traditional Judaeo-Christian religion are anthropocentric in their conception of the world and, given his admission that conceptions of the world involve unresolvable differences in linguistic forms, he recognized that he would be unsuccessful in preaching nonanthropocentrism to them, at least in the short run. He resolved, instead, to argue for a longsighted anthropocentrism based on the intuitive perceptions of Ezekiel: we ought not to "tread down the residue of [our] pasture." Leopold therefore resolved, early in his career, to enter the policy arena armed only with arguments based

on longsighted anthropocentrism, rather than basing his moral strictures on nonanthropocentrism.

II

Leopold's approach to environmental management underwent a profound change between 1920 and 1944. The question I am posing is whether this change resulted from a change in his religious-metaphysical-moral views, or whether the change was motivated by expanding scientific information and hands-on management experience. Having sketched a unified philosophy underlying Leopold's thinking in 1923, it is now possible to ask whether he changed this philosophy in subsequent years. How significantly do Leopold's views, as expressed in the final version of "The Land Ethic" (which dates from 1947), differ from his early views, as stated in "Conservation as a Moral Issue"?

"The Land Ethic" begins with the story of Odysseus' arbitrary hanging of a dozen slave-girls on mere suspicion of misbehavior, a historical example of the changing nature of moral judgments. This example, which was first introduced in 1933 (Leopold 1933a), evokes his earlier view that moral ideas are tied closely to changing patterns of behavior and to the conceptions of thought associated with them. These, in turn, are likely to differ across epochs. Subsequent developments have seen the extension of moral concepts to human individuals previously treated as mere property. This much-discussed example stands as an analogy for the eventual emergence of a full-blown land ethic: "The land-relation is still strictly economic, entailing privileges but not obligations" (Leopold 1949: 201–203). The emergence of a land ethic

> is actually a process in ecological evolution. . . . An ethic, ecologically, is a limitation on freedom of action in the struggle for existence. An ethic, philosophically, is a differentiation of social from anti-social conduct. These are two definitions of the same thing.

Here we see a later representation of Leopold's view that there are multiple conceptions of the world (here represented as two different fields of study, philosophy and ecology) and that these conceptions, which are associated with differing practices, are winnowed by the forces of competition and evolution. An ethic "has its origin in the tendency of interdependent individuals or groups to evolve modes of cooperation. . . . [T]he original free-for-all competition has

been replaced, in part, by cooperative mechanisms with an ethical content" (Leopold 1949: 202).

In 1923 Leopold was drawn to organicism and the ethic associated with it, but he was wary of trying to establish these views rationally because an ethic is so tied up with its characteristic vocabulary and world conceptions. An ecologically sensitive conception of the world will emerge only gradually as we learn, in practice, the extent of our interdependence. In the meantime we must rely on the intuitive wisdom of Ezekiel and our forefathers. In the 1947 version, Leopold was looking forward, predicting that, in the face of greater recognition of our mutual dependencies with other species, we will eventually develop an ethic consonant with the ecological conception of the world. Assuming we survive at all, we will have discovered a world view that is adapted to the modern world, a new set of Hadleian intuitions that will promote survival: "Ethics are possibly a kind of community instinct-in-the making" (Leopold 1949: 203). Leopold's temporary reliance on the traditional strictures of Ezekiel, as well as his faith that a new ethical age will dawn (if we do not destroy ourselves first), are both manifestations of the pluralistic view of world conceptions and the pragmatic conception of truth as survivability.

Near the end of "The Land Ethic" Leopold discussed "Land-Health and the A-B Cleavage":

> Conservationists are notorious for their dissensions. Superficially these seem to add up to mere confusion but a more careful scrutiny reveals a single plane of cleavage common to many specialized fields. In each field one group (A) regards the land as soil, and its function as commodity-production; another group (B) regards the land as a biota, and its function as something broader.

Here, again, we see the conception of a "dead earth" contrasted with that of a "living earth," and Leopold understood the dissensions among conservationists as based, ultimately, on the acceptance of one or the other of these conceptions. References to Ouspensky do not occur, but Leopold's words indicate that he was still fascinated with second-order systems that he called in 1923 "conceptions of the earth." "In all of these cleavages, we see repeated the same basic paradoxes: man the conqueror *versus* man the biotic citizen: science the sharpener of his sword *versus* science the search-light on his universe; land the slave and servant *versus* land the collective organism" (Leopold 1949: 221–223).

"The Land Ethic" differs from "Conservation as a Moral Issue" in lacking the latter's numerous cautions about language and its pitfalls. This is indicative of a deeper shift in Leopold's strategy – he apparently decided not to

emphasize philosophical theory (which he saw as raising issues that can be settled only in the slow-heating crucible of evolutionary selection), but to rely instead on his vast experience as an environmental manager. But the pragmatism and conceptual relativity are still there in muted form, as evidenced by the references, quoted above, to different fields (ethics and ecology) as using alternative vocabularies to describe similar processes and in the discussion of the A-B cleavage.

Thus, while Leopold's philosophical scaffolding is less explicit in his later work, traces of his theoretical commitments remain. The strategic decision to emphasize his experiences as a forester and wildlife manager is deeply pragmatic in spirit. Theory, according to the pragmatist, must ultimately be tested against experience.

Leopold was admittedly tentative in his 1923 pronouncements, perhaps because he had to rely on the philosophical and linguistically relative concepts that he cautioned against. As he matured, gaining experience and replacing philosophical speculation with knowledge of ecological science and the consequences of management strategies, he relied more confidently on his managerial experience (Flader 1974: 18). If, therefore, we use the term "philosophy" to refer to a basic worldview including a metaphysics and value system, we can conclude that Leopold acted, throughout this period, against the backdrop of a consistent and unified philosophical approach.

III

If, however, we use the term "philosophy" more broadly, in a sense in which one might say that Leopold had a "philosophy of environmental management," his philosophy did indeed change. Why did Leopold, acting against a backdrop of unchanging metaphysical and moral worldviews, change his approach to predator control and other management strategies? How could Leopold, in the early twenties, have approved organicism while eradicating wolves and mountain lions?

There is a ready explanation for Leopold's early attempts at predator eradication: trained in the Pinchot mold of utilitarian forestry, Leopold set out to maximize resources for human use (Flader 1974: 25). When he became interested in game management in 1915, he simply transferred forestry management practices to a new resource, fish and game. If a little game is valuable, more is correspondingly so. Predators compete for game, so he set out to eliminate them, as well as to enforce hunting laws and to stock streams – all were management methodologies designed to maximize sport resources.

What requires an explanation is not Leopold's use of these management practices (which were assumed as part of his job), but his doing so while approving organicism and questioning the adequacy of "economic determinism." Leopold already believed in this early stage of his career that the health of the land community is important; but he had not yet realized that all species are necessary to promote that health. He believed that resource managers, provided they are scientific in their management practices, can manipulate populations and he seems to have believed that predator control would enhance the overall health and productivity of biological systems.

With this view as a starting point, Leopold's views of management began a slow evolution toward less radical interventions. By 1925 he believed that wolves and mountain lions contributed to the diversity of an area and he retreated from a goal of eradication to one of control (Flader 1974: 154). When Leopold met Charles Elton, who had initiated the transformation of ecology from a purely descriptive to a more functionally oriented science with the publication of *Animal Ecology* in 1927, he integrated these ideas into his own 1933 text, *Game Management* (Flader 1974: 24–25). Defining "management" as "the coordination of science and use," Leopold stated that "the central thesis of game management is this: game can be restored by the *creative use* of the same tools which have heretofore destroyed it – axe, plow, cow, fire, and gun" (Flader 1974: 25, quoted from Leopold 1933b).

In the 1933 essay "The Conservation Ethic" Leopold noted that there was emerging a new and more positive approach to conservation of the land and living things. The means to the goal of protection was biological research:

> The duty of the individual is to apply its findings to the land. . . . [because] the soil and plant succession are recognized as the basic variables which determine plant and animal life. . . . and likewise the quality of human satisfactions. . . . Leopold 1933a: 641)

Leopold applied this strategy to species preservation, arguing that species become rare and extinct because their habitats have shrunk. He asks:

> Can such shrinkage be controlled? Yes, once the specifications are known. How known? Through ecological research. How controlled? By modifying the environment with those same tools and skills already used in agriculture and forestry. (Leopold 1933a: 641)

In 1933, then, Leopold optimistically believed that ecological research would usher in a new era of plenty based on a positive program of environmental management:

> Given, then, the knowledge and the desire, this idea of controlled wild culture or 'management' can be applied not only to quail and trout, but to *any living thing* from bloodroots to Bell's vireos." (Leopold 1933a: 641)

He as yet saw no inherent contradiction between conservation and intense management for production of resources. Given ecological knowledge, populations could be managed for the good of humans. The reduction of predators would be unproblematic: human hunters would simply absorb the ecological function of wolves and mountain lions. While accepting organicism, he did not yet see that organicism implied a goal of saving all species. He believed that, given sufficient knowledge and sensitivity in management, the living organism (the land) could be kept thriving, while some of its less desirable organs were removed. Faith in ecological technique, therefore, shielded him from the conclusion that destruction of wolves and mountain lions would cause serious illness in the organic system of nature.

By 1939, however, Leopold's view of the role of ecology had changed drastically. He stili believed that ecology "is the new fusion point for all the natural sciences," but its results were not those he had hoped for:

> The emergence of ecology has placed the economic biologist in a peculiar dilemma: with one hand he points to the accumulated findings of his search for utility, or lack of utility, in this or that species; with the other he lifts the veil from a biota so complex, so conditioned by interwoven cooperations and competitions, that no man can say where utility begins or ends . . . the old categories of 'useful' and 'harmful' have validity only as conditioned by time, place, circumstance. The only sure conclusion is that the biota as a whole is useful, and biota includes not only plants and animals, but soils and waters as well. (Leopold 1939: 727)

Leopold concluded that human management activities do not successfully mimic nature in the creation of habitats because "evolutionary changes are slow and local," while human use of tools "has enabled him to make changes of unprecedented violence, rapidity, and scope." Unforeseen changes in species composition result as "larger predators are lopped off the cap of the pyramid." The effects of such changes "are seldom foreseen; they represent unpredicted and often untraceable readjustments in the structure" (Leopold 1939: 728).

Leopold was now regretting his war on wolves. His predator control program and the restrictions on hunting he began to enforce in 1915 in the Southwest had resulted in huge, but starving, herds of deer. The deer overbrowsed the land and caused yet one more downward turn in the cycle of succession. Weedy, brushy species replaced more useful trees and shrubs, and the diversity of the area diminished (Flader 1974: 117).

The 1939 essay "A Biotic View of Land" was in effect a retrospective view of what Leopold had learned as a forester and wildlife manager. He referred to the German experience in tree farming: "Thus the Germans, who taught the world to plant trees like cabbages, have scrapped their own teachings and gone back to mixed woods of native species. . . ." (Leopold 1939: 730; see also Flader 1974: 139f). Similarly, he came out definitively against predator control as a "highly artificial (i.e., violent)" method of management (Leopold 1939: 729). Additionally, he had observed the extent and seriousness of the dust bowl phenomenon, of what pervasive "economic management" could do to fragile ecosystems.

Leopold therefore changed his views of management because:

> In short, economic biology assumed that the biotic function and economic utility of a species was partly known and the rest could shortly be found out. That assumption no longer holds good; the process of finding out added new questions faster than new answers. The function of species is largely inscrutable, and may remain so. (Leopold 1939: 727)

We need not posit any shift in Leopold's metaphysical or moral views to explain the changes in his views on wildlife management. He learned through practice that "violent" methods of management and control are inappropriate because they also cause unforeseen effects and damage the biotic community. This is an insight that was implicit in his belief in the importance of ecology; but it was obscured by his initial faith that ecology would teach us enough about ecological interactions among species to allow manipulation of populations for utilitarian purposes. He underestimated the complexity of systems and overestimated our ability to control them; he consequently failed to see that predator protection was one of the principles implied by the holistic approach that he advocated in opposition to the economic determinism he rejected. In the face of practical evidence, the pest problems of monocultural forestry, and deer starving on overgrazed reserves, Leopold eventually adopted a less violent and disruptive approach toward management.

IV

Should Leopold be classed as an anthropocentrist? Yes and No.

Yes, in the sense that he believed that, for better or worse, humans must and should manage the natural world. Given that, and current attitudes in society, arguments based on the good of the human species will carry more

weight in policy debates. After summarizing the structure of the land pyramid and describing the land as an "energy circuit," Leopold summarized his land ethic in three basic ideas: "(1) That land is not merely soil. (2) That the native plants and animals kept the energy circuit open; others may not. (3) That man-made changes are of a different order than evolutionary changes, and have effects more comprehensive than is intended or foreseen. These ideas, collectively, raise two basic issues: Can the land adjust itself to the new order? Can the desired alterations be accomplished with less violence?" (Leopold 1949: 218). This is anthropocentrism of sorts. Leopold accepted that humans will alter the biota. Their management will be successful if they protect life and if the human race survives. It will be a failure if the human race, "like . . . John Burrough's potato bug, which exterminated the potato, . . . exterminates itself" (Leopold 1979: 141). Leopold never questioned the right of humans to alter nature, provided these alterations were consistent with ecological knowledge and would protect, in the long run, human life and the living land on which it depends.

But Leopold regarded both anthropocentrism and its denial as representing only human conceptions, as artifacts of human perceptions rather than reality. To try to determine the truth of these speculative pronouncements without reference to the systems in which they are embodied is to go beyond the possibilities of language. And yet there is a legitimate sense in which Leopold was a nonanthropocentrist. He saw organicism as an alternative to mechanism, one that would carry with it a deeper, even moral, reaction to the land. This view, while it can hardly be expressed in our current vocabulary, is true in the pragmatic sense – it has survival value. Leopold's dream that someday our culture will evolve a more sensitive reaction to the land explains the central role he always placed, as an environmental professional, on developing public perception. He believed that, as Americans become more aware of their interdependence with the rest of the biotic world, they will gradually develop a new conception of the world, including a moral reaction to the community of life. This development will, he thought, improve the survival chances of our culture and he therefore devoted his career to improving the perception of the American public.[5]

Leopold's actual target was not anthropocentrism, however. He concluded that nonanthropocentrism raises issues too intractable to make it useful in management discussions. Instead, he attacked shortsighted economic reasoning that ignores the scientific evidence that intense management often leads to gradual decline in productive systems.[6] Leopold recognized, in the degeneration of vegetative systems in the Southwest, in German forestry, and in the dust

bowl phenomenon, the inadequacy of management practices based solely on Pinchot's utilitarian criterion. The search for profit, "economic determinism," leads inevitably to an undervaluing of future resources. But shortsighted, destructive practices are wrong even if we are "logically" anthropocentric. Anthropocentrism itself should imply a concern for future generations.

Leopold acted upon what I call the "convergence hypothesis" (Norton, 1991). According to that hypothesis, the interests of humans and the interests of nature differ only in the short run. If we recognize the extent to which the human species is an integral part of the community of life, long-term human interests coincide with the "interests" of nature. To protect the fullness of life is to protect the far-distant future of the human species and its evolutionary successors, and vice versa. Since the survival of our culture depends upon the survival of the ecosystems on which we, in turn, depend, the conception of the world one adopts is less important than the longsightedness with which it is applied in environmental management.

NOTES

1. Leopold used the term "anthropomorphic" as we currently use "anthropocentric" – to refer to a value system that bases all value in human motives. Except in quotations of Leopold, I will follow current practice and use "anthropocentric."
2. Pragmatists described their conception of truth in several ways. James tended to emphasize the "effectiveness" of true ideas (see, for example, James 1948: 162). Peirce emphasized that truth is that which will last through an indefinite number of experiments and actions. He said that truth is "the predestined result to which sufficient inquiry *would* lead" (Peirce 1978: 288). The reader should not be disconcerted by Leopold's shift from Hadley's discussion of "right" to a definition of "truth" – the pragmatists drew no sharp distinction between facts and values and therefore treated "true" and "right" as largely interchangeable. Leopold's application of "truth" to cultural practices would be acceptable to pragmatists such as Hadley.
3. Curt Meine, who has just completed a biography of Leopold based on the collection of Leopold's papers, informs me that he found evidence that Leopold read the *Yale Review* regularly.
4. Again, Meine is my source of information here.
5. For a fuller discussion of the central role of "transformative values" in environmental ethics, see Norton (1987, Chapter 10).
6. For a discussion of Leopold's use of the term "economic," see Norton (1986: 208).

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